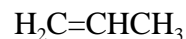


## PROPENE

CAS Registry Number: 115-07-1



Molecular Formula:  $\text{C}_3\text{H}_6$

Propene is a highly flammable, colorless gas. It is soluble in alcohol and ether, and is slightly soluble in water. Propene burns with a yellow, sooty flame (Merck, 1989).

### Physical Properties of Propene

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Synonyms: propylene; methylethene; methylethylene; 1-propene

Molecular Weight:	42.08
Boiling Point:	-47.7 °C
Melting Point:	-185 °C
Flash Point:	-108 °C
Vapor Density:	1.49 (air = 1)
Vapor Pressure:	10 atm at 19.8 °C
Density/Specific Gravity:	0.5139 at 20/4 °C (water = 1)
Conversion Factor:	1 ppm = 1.72 mg/m <sup>3</sup>

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(Merck, 1989; Sax, 1987; Sax, 1989)

## SOURCES AND EMISSIONS

### A. Sources

Propene is used in the polymerized form as polypropylene plastic. It is also used in the manufacture of acetone, isopropyl benzene, isopropyl alcohol, isopropanol, isopropyl halides, propylene oxide, polymer gasoline, acrylic acid, vinyl resins, oxo chemicals, and acrylonitrile. It is obtained from petroleum oils during the refining of gasoline (Merck, 1989). Approximately 300 million pounds of propene was produced in California in 1993 (SRI, 1993).

The primary stationary sources that have reported emissions of propene in California are paper mills, petroleum refining, and crude petroleum and natural gas extraction (ARB, 1997b). Propene has also been detected but not quantified in motor vehicle exhaust by the Air Resources Board (ARB) (ARB, 1995e).

### B. Emissions

Toxic Air Contaminant Identification

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The total emissions of propene from stationary sources in California are estimated to be 1.1 million pounds per year, based on data reported under the Air Toxics “Hot Spots” Program (AB 2588) (ARB, 1997b).

#### C. Natural Occurrence

No information about the natural occurrence of propene was found in the readily-available literature.

### **AMBIENT CONCENTRATIONS**

No ARB data exist for ambient measurements of propene.

### **INDOOR SOURCES AND CONCENTRATIONS**

No information on the indoor sources and concentrations of propene was found in the readily-available literature.

### **ATMOSPHERIC PERSISTENCE**

Propene exists in the atmosphere in the gas phase. In the troposphere, propene reacts with hydroxyl (OH) radicals, NO<sub>3</sub> radicals, and ozone O<sub>3</sub>, with the dominant atmospheric loss process for propene being calculated to be the reaction with the OH radical. Based on this reaction, the atmospheric half-life and lifetime of propene is estimated to be 9 hours and 13 hours, respectively (Atkinson, 1994). The reaction products are formaldehyde, acetaldehyde, and small amounts of organic hydroxynitrates. The O<sub>3</sub> reaction also leads to the formation of formaldehyde and acetaldehyde (Atkinson, 1995).

### **AB 2588 RISK ASSESSMENT INFORMATION**

The Office of Environmental Health Hazard Assessment reviews risk assessments submitted under the Air Toxics Hot Spots Program (AB 2588). Of the approximately 550 risk assessments reviewed as of April 1996 reporting a total cancer risk equal to or greater than 1 in 1 million, propene contributed to the total cancer risk in 3 of these risk assessments. Propene also contributed to the total cancer risk in 2 of the approximately 130 risk assessments reporting a total cancer risk equal to or greater than 10 in 1 million (OEHHA, 1996a).

For non-cancer health effects, propene contributed to the total hazard index in 2 of the approximately 89 risk assessments reporting a total chronic hazard index greater than 1. Propene also contributed to the total hazard index in 3 of the approximately 107 risk assessments reporting a total acute hazard index greater than 1 (OEHHA, 1996b).

## HEALTH EFFECTS

The most probable route of human exposure to propene is inhalation.

Non-Cancer: Short-term exposure to propene by inhalation has resulted in dizziness, mild intoxication, and anesthesia. Irritation of the eyes, tearing, coughing, and flushing of the face have been noted in exposed individuals. Irregular heart beat and reduced blood pressure have also been observed after inhalation exposure. Experimental animals have shown liver damage from inhaled propene (HSDB, 1995). Unconsciousness and death can result from high level exposure due to lack of oxygen (Sittig, 1991).

The United States Environmental Protection Agency (U.S. EPA) has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for propene (U.S. EPA, 1995a).

Cancer: The U.S. EPA has not classified propene as to its carcinogenic potential (U.S. EPA, 1995a). The International Agency for Research on Cancer has classified propene as Group 3: Inadequate evidence as to its carcinogenicity (IARC, 1987a).

